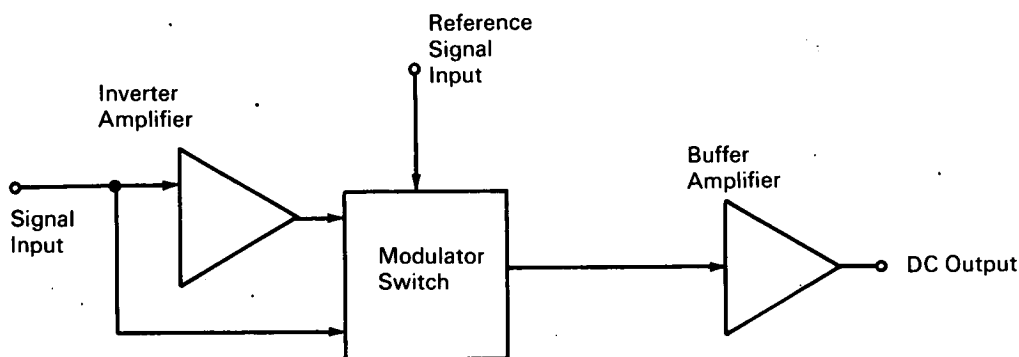


# NASA TECH BRIEF



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## Solid State Phase Detector Replaces Bulky Transformer Circuit



### The problem:

To design a miniature phase detector to be used in a phase lock loop associated with a sub-bit detector in an integrated data-link circuit. The phase detector is to be used in lieu of a bulky transformer circuit commonly incorporated in phase lock loops. Input requirements are to be compatible with standard logic levels.

### The solution:

A solid state phase detector employing MOSFET's (Metal Oxide Semiconductor Field Effect Transistors).

### How it's done:

The solid state phase detector consists of an inverter amplifier, a modulator switch, and a buffer amplifier. The output of the inverter amplifier is a signal that is inverted (180 degrees out of phase) with respect to the input signal. The modulator switch performs a mixing function. It provides a signal of fixed amplitude but opposite polarity every half cycle at a rate determined

by the reference switching frequency. This switching function is accomplished by two MOSFET's (in the modulator switch), one of which is connected to the input signal and the other to the inverted signal.

### Note:

Inquiries concerning this invention may be directed to:

Technology Utilization Officer  
Manned Spacecraft Center  
Houston, Texas 77058  
Reference: B67-10253

### Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: C. L. Moberly  
of Motorola Inc.  
under contract to  
Manned Spacecraft Center  
(MSC-11007)

Category 01

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Report Number: 73-101

Contract Number: N00019-73-1-0001

Project Number: 73-101

Task Number: 73-101

Phase: 73-101

Subtask: 73-101

Task Number: 73-101

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